

Spatial planning of global mangrove ecosystems for conservation and fishing

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Mangrove forests are located in tropical and subtropical coastal areas and provide fundamental ecosystem functions, goods and services, including coastal protection, carbon sequestration, aesthetic and recreational benefits. They also support fisheries by providing spawning grounds, shelter and feeding areas for commercial and small-scale species that support local communities, particularly in developing nations. Anthropogenic activities – including land conversion and climate change – are threatening the future of these ecosystems. We will develop a climate-smart global network of protected areas to secure the conservation of these habitats, preserving their ecological, social and economic value. To prioritise areas for including in the marine protected areas network we use the R package *prioritizr*. We will select areas that permit the protection of all the mangrove species from each geomorphic setting and marine province. We will also prioritise the conservation of areas for blue carbon, to preserve present carbon sinks and future carbon sequestrations, coastal protection, to reduce future disaster risk, and fisheries benefits, to guarantee food security in particular for local communities. The approach developed is novel because it seeks to maximise both fisheries and conservation benefits, rather than the typical approach of minimising conflict between fisheries and conservation as is the common practice. Areas are prioritised based on climate-smart principles, by selecting mangroves that will be able to migrate landward in response to sea-level rise and by defining larger marine protected areas in regions more impacted by extreme climatic events. The outcomes of this work could inform conservation and sustainable fisheries practices.

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